

15¢

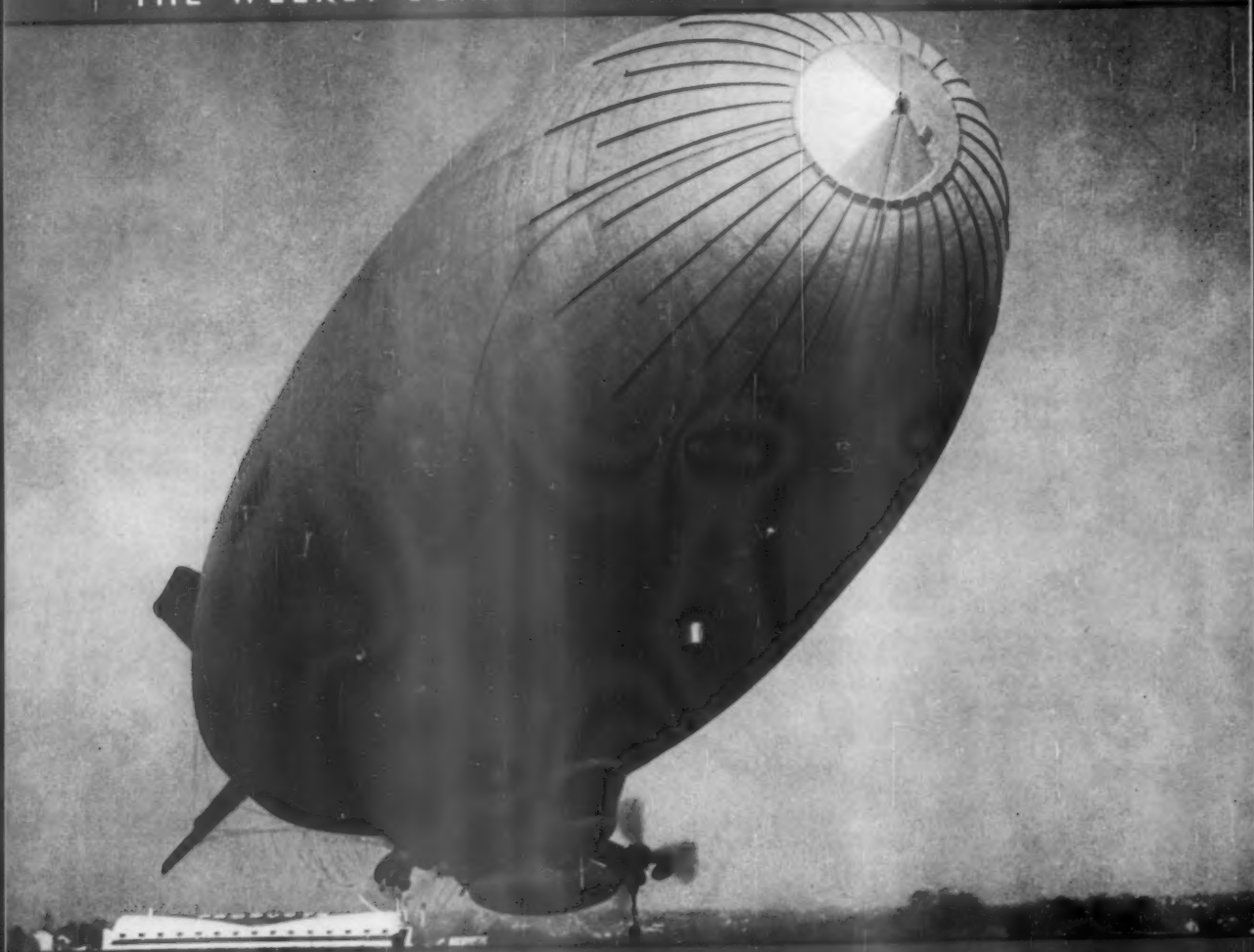
\$5.50 A YEAR

September 3, 1955

VOL. 63, NO. 18 PAGES 143-160

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Radar Picket Blimp

See Page 152

A SCIENCE SERVICE PUBLICATION



After initial adjustments are made, as in photograph, "Mr. Meticulous" automatically performs critical operations in making junction tetrode transistors—tiny experimental devices which may find important uses in the telephone system.

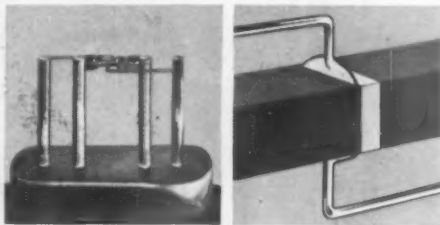
The machine we call "Mr. Meticulous"

Bell Laboratories scientists, who invented the junction transistor, have now created an automatic device which performs the intricate operations required for the laboratory production of experimental model transistors.

It takes a bar of germanium little thicker than a hair and tests its electrical characteristics. Then, in steps of $1/20,000$ of an inch, it automatically moves a fine wire along the bar in search of an invisible layer of positive germanium to which the wire must be connected. This layer may be as thin as $1/10,000$ of an inch!

When the machine finds the layer, it orders a surge of current which bonds the wire to the bar. Then it welds the wire's other end to a binding post. Afterward, it flips the bar over and does the same job with another wire on the opposite side!

Once only the most skilled technicians could do this work, and even their practiced hands became fatigued. This development demonstrates again how Bell Telephone Laboratories scientists work in every area of telephony to make service better.



Transistor made by new machine is shown in sketch at left, magnified 6 times. At right is sketch of area where wires are bonded. The wires are $2/1000$ inch in diameter, with ends crimped to reduce thickness.

BELL TELEPHONE LABORATORIES

Improving telephone service for America provides careers for creative men in mechanical engineering.



PUBLIC HEALTH

Cutter Vaccine Mystery

Public Health Service, in long-awaited report, concludes that live polio virus in lots of vaccine from Cutter Laboratories caused some of the 79 cases of infantile paralysis.

► THE CUTTER Laboratories polio vaccine mystery is likely to remain a mystery.

This is clear from the facts given in the long-awaited report from the Public Health Service, Department of Health Education and Welfare.

True, the report concludes that development of polio in some of the 79 cases which developed after getting Cutter vaccine was the result of the presence, in infective amounts, of live polio virus in some distribution lots of Cutter vaccine.

Discovery of Type I polio virus in some of the vaccine by Public Health Service and other laboratories supports this conclusion.

This, however, had been pretty strongly suspected long before the official report of the 90-day study. The big question has been, how did the live virus get into the vaccine that was given to the children? (An estimated 401,000 children were reported to have gotten Cutter vaccine, although most of the polio cases were associated with only a few lots.)

That question is not answered by the report, which states:

"The exact reasons for the presence of infective amounts of live virus in some lots of Cutter vaccine could not be found."

If not found after the long and thorough study, the reasons are not likely ever to be found.

Details of Cutter Laboratories' method of making the vaccine are not given in the report. This may be for legal reasons, as given in the following note at the end of the report:

"Federal Law (18 U.S.C. 1905) prohibits public disclosure, not authorized by law, by officers or employees of the United States of information concerning business processes or operations obtained by them in the course of investigation."

The details of Cutter polio vaccine production that are not given are the ones doctors and other scientists might want to scrutinize to determine whether:

1. The vaccine became contaminated.
2. Manufacturing methods failed to kill the virus.
3. Safety tests of the final product were adequate.

On these points the official report states nothing was found to indicate that contamination was the trouble but that the study "did produce data suggesting the combination of inadequacy of virus inactivation and failure of the safety tests as responsible for live virus remaining undetected in the finished vaccine."

Before May 27, however, there were "fundamental weaknesses" in the safety testing procedures in general use, the report

points out. Also, other manufacturers had found inadequate inactivation was not unusual.

Whether Cutter Laboratories were having more trouble than other manufacturers and whether they should have asked the Public Health Service for help with this trouble are questions the report does not answer.

Science News Letter, September 3, 1955

METEOROLOGY

Tornadoes Made In Laboratory Box

► TORNADOES and the spiraling whirlwinds often accompanying intense forest fires have been made in miniature in a laboratory box by a New York University scientist.

James E. Miller, professor of meteorology in NYU's college of engineering, reports his experiments with the weather model in *Weatherwise* (Aug.).

A shallow pan of water fits in the center

of a circular box about two and a half feet across. A roof fan draws air from the chamber.

To make a model tornado, the water is heated, then fresh air is blown through two vertical slits in the wall so that it spins around the center. Steam from the pan begins to rotate slowly, and suddenly forms a sharply defined vertical column an inch or two in diameter with a hollow core.

Wisps of steam at the column's edge spiral upward quickly. Water in the pan bulges up a half inch or so in a miniature waterspout, and droplets are thrown violently outward.

To make the fire whirlwind, a can of Sterno, "canned heat," replaces the pan of water. Soon after the Sterno is lit and the blower turned on full force, a reddish circular column of flame roars upward about 18 inches.

In the model tornado and fire whirlwind, centrifugal force in the core clashes with rotational drag of air spiraling toward the center.

The laboratory model is based on ideas set forth by W. H. Dines, a British meteorologist, in 1896.

If a small balloon about an inch in diameter is dropped in the pan of water, Mr. Miller reports, the air circulation draws it toward the center, where it spins rapidly. Later it is picked up by the strong updraft in the center. Then, almost instantaneously, it is carried straight to the top of the chamber and thrown outward.

Science News Letter, September 3, 1955



MAN-MADE TORNADOES—A spiraling column of steam rises from a pan of hot water in the "tornado chamber" built by Prof. James E. Miller, who is at the controls. The scientist, a meteorology professor at New York University, has also reproduced the fire whirlwinds that often accompany forest fires in his laboratory box.

PUBLIC HEALTH

Fight Germ Diseases

► **FUTURE OF THE NATION** demands continuing with vigor the fight against communicable diseases, from polio to the common cold.

Concern for the health problems of the older persons in the population, even though their numbers are growing, must not overshadow the importance of communicable diseases. Otherwise, the next generation of older persons will lack vitality and stamina.

This, in essence, is the warning of Dr. Theodore J. Bauer of the Public Health Service's Communicable Disease Center, Atlanta, Ga., in the *Journal of the American Medical Association* (Aug. 20).

"The children and younger men and women must have a top priority in our health programs if we are to assure the vitality and stamina of our future adult populations," he states. They are the ones chiefly attacked by the communicable diseases, he points out.

One in every four deaths in the age group under 35 years is caused by a communicable disease. In the older group it is one in 12. In addition, communicable dis-

eases cause the majority of absences from school and work, and may lead to future disorders of heart, liver, kidneys and nervous system.

The virus diseases are "perhaps of greatest concern" right now, Dr. Bauer says. The problem of polio in the United States, for example, "cannot be accurately measured by the more than 36,000 cases reported in 1953 or by the 58,000 cases reported in a high epidemic year such as 1952," he states.

"This baffling disease is now distributed over the entire United States and its incidence has been increasing for more than a decade."

Pointing to its increase in many other parts of the world, Dr. Bauer says we may be seeing a "world-wide pandemic, the end of which is not yet in sight."

Viral hepatitis, better known to the layman as jaundice; psittacosis, or parrot fever; rabies; smallpox; yellow fever; the common cold, and insect-carried encephalitis of man and horses are other of the virus diseases Dr. Bauer says we must continue to fight.

Science News Letter, September 3, 1955

PHILOLOGY

List 2,000 Languages

► **ABOUT 2,000** completely distinct languages are spoken in the world and nearly half of this number are native to North and South America, estimates Dr. J. Alden Mason, curator of the University of Pennsylvania Museum in Philadelphia. There are or were, more separate languages in California than in all Europe.

Relatively few have ever been put in writing.

There are no primitive languages, declares Dr. Mason, who is a specialist on American languages. The idea that "savages" speak in a series of grunts, and are unable to express many "civilized" concepts, is very wrong.

"Of course, the savage has no single word for 'atom' or 'isotasy,' but if he had to explain the concepts in his language he would have no difficulty in doing so.

"In fact, many of the languages of non-literate peoples are far more complex than modern European ones," Dr. Mason said. "English is one of the simplest languages in the world." Only Chinese is simpler.

Evolution in language, Dr. Mason has found, is just the opposite of biological evolution. Languages have evolved from the complex to the simple. In the case of Latin, for instance, its modern descendants, Italian, Spanish, Portuguese, French, are grammatically simpler than the parent.

"Of course there must have been a time," he said, "when grammars were building up,

but that time was early in human history, maybe hundreds of thousands of years ago; of that period we know nothing."

Today primitive peoples may roughly represent the speech of Stone Age Man. Typically, their grammars are much more complex; they often have more genders, numbers, persons, tenses and modes, especially the latter, than any modern language.

Many American Indian languages are on the verge of extinction, spoken by only a dozen persons.

Little by little, the University Museum is building up a collection of recordings of the speech and songs in these little-known languages before they disappear completely. The project is described by Dr. Mason in the *University Museum Bulletin* (June).

Science News Letter, September 3, 1955

MEDICINE

Anti-TB Chemicals Cause More "Vanishing Lungs"

► **"VANISHING LUNG"** cases are becoming more common as a result of treatment of tuberculosis with streptomycin and, particularly, the newer anti-TB chemical, isoniazid, Dr. Israel Rappaport of New York charges in the *Journal of the American Medical Association* (Aug. 20).

"Vanishing lungs" are lungs in which there are thin-walled abnormal air spaces.

They look as if areas of lungs were actually vanishing. They have been known before chemicals for treating tuberculosis became available.

The chemicals cause the condition, Dr. Rappaport says, because they stop the tuberculosis before thick-walled cavities or dense fibrous tissue has time to form.

The abnormal air spaces, also called "cyst-like cavities," should be removed by operation whenever possible, Dr. Rappaport advises. They may, if left, be potential sources of flare-up of the tuberculosis in a large proportion of cases. In addition, they are potential sites, he thinks, for progressive air space disorders, such as emphysema.

Science News Letter, September 3, 1955

SCIENCE NEWS LETTER

VOL. 68 SEPTEMBER 3, 1955 NO. 10

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N.W., Washington, D. C., NORTH 7-2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

Copyright, 1955, by Science Service, Inc. Reproduction of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service. Science Service also publishes CHEMISTRY (monthly) and THINGS of Science (monthly).

Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C., under the act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for by Sec. 344, P. L. and R., 1948 Edition, paragraph (d) (act of February 28, 1925; 39 U. S. Code 283), authorized February 28, 1950. Established in mimeographed form March 19, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 1 E. 34th St., New York 22, Eldorado 5-5666, and 435 N. Michigan Ave., Chicago 11, Superior 7-6048.

SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: Kirtley F. Mather, Harvard University; Paul B. Sears, Yale University; Karl Lark-Horowitz, Purdue University. Nominated by the National Academy of Sciences: Edward U. Condon, Berkeley, Calif.; Harlow Shapley, Harvard College Observatory; George W. Corner, Carnegie Institution of Washington. Nominated by the National Research Council: Ross G. Harrison, Yale University; Leonard Carmichael, Smithsonian Institution; Jerome Hunsaker, Massachusetts Institute of Technology. Nominated by the Journalistic Profession: Neil H. Swanson, Ruxton, Md.; O. W. Riegel, Washington and Lee University; Michael A. Gorman, Flint Journal. Nominated by the Scripps Estate: Edward J. Meeman, Memphis Press-Scimitar; John T. O'Rourke, Washington Daily News; Charles E. Scripps, Cincinnati, Ohio.

Officers—President: Leonard Carmichael; Vice President and Chairman of Executive Committee: Charles E. Scripps; Treasurer: O. W. Riegel; Secretary: Watson Davis.

Staff—Director: Watson Davis. Writers: Jane Stafford, Marjorie Van de Water, Ann Ewing, Horace Loflin, Howard Simons, Dorothy Schriver, Helen M. Davis. Science Clubs of America: Joseph H. Kroust, Margaret E. Patterson. Photography: Fremont Davis. Production: Priscilla Howe, Marcia Nelson. Interlingua Division in New York: Alexander Gode, 80 E. 11th St., GRamercy 3-5410.

GENERAL SCIENCE

Unsecret "Secrets"

Previously secret research results reported at Geneva confirm long-held belief that scientists of other nations have done same research. Russia, U.S. vie in "Atoms-for-Peace."

By WATSON AND HELEN DAVIS

▶ IN A half dozen fields, scientists of various nations meeting at the International Conference on the Peaceful Uses of Atomic Energy in Geneva confirmed what most of them suspected—their hard-won secrets, jealously guarded, have been discovered by other nations through the brains and scientific sweat of their scientists.

Specifically, these secrets include:

The ability of the fissionable, or atomic-power producing, elements to capture neutrons. The neutron's cross section, as determined in the United States, Britain, Russia, France and Norway, agrees so closely that differences cannot be detected on a diagram. This fundamental information about plutonium, uranium 235 and 233, was previously closely guarded. Necessary for making bombs and reactors alike, the world has been given this information which each national group was hiding.

The separation of the metals zirconium and hafnium was reported by six processes in about as many nations, all unannounced heretofore. Although the United States is the only country with sizable commercial zirconium production, other localities will be able to produce this metal which is useful in coating the fuel in atomic reactors.

When Russian medical experts compared their radiation safety practices with those of the Western block, the same figures for safe exposure of workers in atomic industry plants appeared, about 50 milliroentgens per day being considered safe. The Russians like to set their controls daily, while the U. S. and United Kingdom prefer to use 300 milliroentgens a week as the figure after which the worker is given an enforced vacation for his own protection. There is no agreement on what lifetime dose is dangerous.

There was agreement there is danger of influencing unborn generations through genetic changes produced by very low levels of radiation, but the extent of such danger is not agreed upon by experts of different nations or even of the same nation.

Atoms-for-Peace Race

▶ THE RACE between the United States and Soviet Russia to provide research reactors to nations within their spheres of influence was pointed up in reports to the conference.

Dr. A. N. Lavrishchev announced Russia's assistance in furnishing peacetime atomic reactors and equipment for physics research

to the People's Republics of China, Poland, Czechoslovakia, East Germany, Rumania, Bulgaria and Hungary.

The Soviet Union said it would provide each country, at cost, 2,000-kilowatt nuclear reactors "for the production of isotopes," and cyclotrons capable of speeding up atomic particles to energies of 25,000,000 electron volts.

Russia will also furnish the natural uranium, thorium, uranium 235, uranium 233, plutonium, tritium and heavy water needed to operate the equipment.

The People's Republic of China is an exception. For China, the Russians are designing a 6,500-kilowatt reactor whose capacity "can be increased up to 10,000 kilowatts."

Delegations from countries receiving assistance from the Soviet Union visited Russia from March to June of this year to learn

about operation of reactors and cyclotrons.

Dr. Willard F. Libby, U. S. Atomic Energy Commission member, reviewed at the conference previously announced agreements made by the United States with more than 25 nations providing for exchange of information on atomic energy uses.

These agreements also called for the U. S. to furnish some of these countries, at half cost, research reactors, such as the swimming-pool type that proved to be a major attraction at the Geneva conference. The U. S. will also provide fuel to operate the reactors.

The U. S., Dr. Libby said, is prepared to conclude similar agreements with many more countries, although he did not mention any nations specifically.

Both the U. S. and Russian atomic agreements include training scientists from co-operating countries in reactor and cyclotron techniques.

Saving Old Landmarks

▶ ATOMIC RADIATION may save the aged timbers of Westminster Abbey, St. Paul's Cathedral, hundreds of ancient churches and other wooden relics of the past from destruction by gnawing, devouring insects.

Sir John Cockcroft told the conference



MODEL ATOM SMASHER—This one-ton model accelerator is being built at the University of Michigan to test a new principle for a 25-billion-electron-volt giant the Midwestern Universities Research Association hopes to construct in the Midwest. The design is expected to result in a simplified machine 100 times more efficient than existing atom smashers (see SNL, Feb. 5, p. 92). Pictured with the model are, from left to right, Drs. Kent M. Terwilliger and Lawrence W. Jones of the University of Michigan, and Dr. Donald W. Kerst, University of Illinois.

that experiments by the British Forest Products Laboratory indicate low doses of radiation make infertile the eggs of the death-watch beetle, which has been literally eating away the timbers of age-old landmarks in England.

Previously there has been no effective treatment to rid ancient structures of this pest, although thousands of pounds and years of research have been spent in the effort. Now British scientists feel that exposing infested timbers to radiation doses may rid them of the death-watch beetle's destruction.

Probably one of the first old relics they will try to save will be Nelson's flagship, the Victory, which is riddled with the pest. In one short test period, more than 7,000 beetles were picked off the lower deck of the wooden ship.

Westminster Abbey, Westminster Hall and St. Paul's Cathedral are other famous structures that need aid from the death-watch beetle in a hurry. The eerie, tapping sound of the beetle from its cavities cut through ancient oak is a familiar one in countless old churches throughout the island.

The death-watch beetle is a serious pest in most of Europe, as well as in England. It is found to some extent in this country, in New England. Most of the damage is done by the larva of the beetle.

If the British are successful in a campaign against the death-watch beetle using atomic radiation, the technique may become widespread in other phases of insect control.

Perpetual Batteries

► SOME KINDS of electrical batteries of the future will be powered by by-product atomic radiation converted directly into electricity, Dr. E. G. Linder of the Radio Corporation of America, Princeton, N. J., told the conference.

Some atomic batteries giving small but constant amounts of power are ready for practical use. Future developments will determine whether there can be commercial developments at high power levels.

About a dozen research organizations are working on this problem, Dr. Linder reported.

Radioisotopes from the debris of U. S. atomic power reactors a decade hence might furnish the radiation that could be converted into electrical energy equivalent to 2,000,000 watts from the annual production of batteries. This possible substitution of atomic batteries for present conventional chemical ones is foreseen by Dr. Linder.

Radioactive wastes from reactors most desirable for atomic batteries include radioactive strontium 90 and yttrium 90, and tritium, or triple-weight hydrogen, probably an H-bomb element. These are cheap enough for such battery use. They also have a long enough life.

As other radioactive substances do, they require shielding to prevent radiation danger to people and damage to materials. When nickel 63 becomes cheaper than at

present, it will become a favorite for use in atomic batteries, because of its long life and the tameness of its radiation.

Four main methods of converting radiation into electricity are being tried:

1. Simple collection of charged radiation by an electrode to create a voltage.
2. Using contact potential fields to separate charges and produce currents.
3. Generation of heat by radiation upon thermocouples that produced current.
4. Radiating semiconductor junctions to produce and separate out currents.

Science News Letter, September 3, 1955

TECHNOLOGY

Pave Dirt Roads With Peanut Husks

► INDIAN SCIENTISTS have found a way to pave dirt roads with peanut husks.

A dark liquid from peanut shells is the key material in the process that can turn rutted, muddy roads to hard, sturdy surfaces. The soil is first treated with the dark liquid and dried. Adding calcium chloride then causes formation of a gelatinous mass in the soil that holds the tiny earth particles together.

Earths with high sand content harden best in the process, L. R. Chadda and S. R. Mehra of the Laboratory at Karnal, India, report in *Highway Research Abstracts* (June).

The treatment increases the soil's resistance to friction and lowers its tendency to form mud when wet.

Chemically hardening dirt roads is a widespread practice in the United States to improve secondary arteries of travel. Furfural, a chemical from oat hulls, is one of today's most important stabilizing agents.

The Indian scientists said their process may not prove economical for large-scale road paving because of the cost of obtaining the husk liquid.

Science News Letter, September 3, 1955

MEDICINE

Doctors Should Look Warts in the Eye

► IN TREATING WARTS, "look them straight in the eye, telling them they must go." This advice to doctors from a physician and skin specialist, Dr. David I. Williams, King's College Hospital, London, is given in the *British Medical Journal* (Aug. 20).

"Remember always that you must be firm and confident with warts," Dr. Williams states.

"Without such certainty of success, any treatment must fail. Even with it, failure may sometimes occur," he says, "but this fact must be kept from the wart and from the patient."

For the medical part of the treatment he uses mostly a three percent formaldehyde lotion or a lotion containing mercury biniodide and salicylic acid.

Science News Letter, September 3, 1955



HIGH - FREQUENCY TRANSISTOR—Bridged between the two center "posts" is an experimental transistor, the junction tetrode, developed by Bell Telephone Laboratories that has produced more than a billion oscillations per second.

TECHNOLOGY

Transistor Sets Record For High Frequencies

► NEARLY ALL the vacuum tubes in a television set can now be replaced with tiny transistors, modern offspring of the crystals in the old "cat whisker" radio sets.

The transistor took this leap into vacuum tube territory with the announcement in New York by Bell Telephone Laboratories that its latest experimental transistor has set a new high frequency record. It flipped current from positive to negative more than a billion times a second. This transistor can handle frequencies well into the UHF, or ultra-high frequency, television range.

Such high frequency would also permit transistors to take over the job of tubes in installations that pack hundreds of telephone conversations into a single set of wires. The billion-cycle transistor is called a junction tetrode transistor.

Earlier junction transistors, limited to lower frequency ranges, are composed of sandwiched layers of p-type, or positive, and n-type, or negative, germanium.

Frequency was raised in the new experimental unit by reducing the width of the germanium bar and the central p-layer, and by adding a fourth electrode. The central layer is less than five-thousandths of an inch wide.

Advantages of the transistor over the vacuum tube are that it is more rugged, does not get as hot, takes up less space and is far less wasteful of power.

Production of the new transistors is scheduled to begin this year.

Science News Letter, September 3, 1955

TECHNOLOGY

Atomic Heat Engines

► STEAM ENGINES, which have been standard industrial equipment for more than a century, have rivals in the atomic age.

In these newer heat engines, liquid metals take the place of water for generating steam, transferring heat and cooling the reactor.

Problems arising out of the difference between the properties of liquid metals and the corresponding properties of water were discussed at the International Conference on the Peaceful Uses of Atomic Energy in Geneva.

For taking up heat at one part of the power cycle and releasing it at another, where it can be made to do useful work, water is an excellent material, but it has the newly important quality of slowing neutrons. This is a disadvantage in a reactor run for power.

This disadvantage, plus the fact that metals can be heated to higher temperatures, turned the attention of nuclear power plant designers to liquid metals and to a variety of other materials that might be pumped through the pipes of the heat exchangers.

In reporting on his company's experience in handling liquid metals, Dr. S. G. Bauer of Rolls-Royce, Ltd., Derby, England, listed 20 different materials that could, because of the range of their melting and boiling points, be substituted for water in atomic power reactors.

Among materials suggested by Dr. Bauer are organic compounds of both carbon and silicon, inorganic salts, caustic soda, sul-

furic acid, and a number of chemical elements and metallic alloys.

"Not all the substances mentioned are either readily available or suitable as heat transfer fluids," Dr. Bauer said. "The situation might fairly be summarized by saying that in the case of the fast reactor we are forced to liquid metal coolants, while in the case of thermal power reactors there are great potential advantages to be set off against the difficulties of introducing a new technology."

Fire when light metals are used and poisoning from heavy metals are two disadvantages of the new technology. Much more serious corrosion results also from the oxides, the nitrides, the hydrides and the hydroxides of metallic coolants than in water-cooled plants.

Leak tightness is essential in the machinery, and any open surface of the liquid metal must be covered with an artificial atmosphere of some inert gas.

Oxides and other corrosion products can be drawn off while the liquid metals are circulating, Dr. Bauer reported, by putting a "cold trap" into the stream. Here part of the circulating metal, chilled to its freezing point, gradually collects floating bits of corrosion products to prevent their clogging the pipes.

New types of electromagnetic pumps, in which the conventional armature current is replaced by current induced in the circulating liquid, have opened design fields not foreseeable in steam plants.

Corrosion problems were also discussed

by Dr. Leo F. Epstein of the Knolls Atomic Power Laboratory of the General Electric Co., Schenectady, N. Y. He said that since the end of the Stone Age, man has had long, although limited, experience with handling metals.

He reviewed the experience the General Electric Co. has accumulated since 1922 in operating its mercury vapor turbine for generating electric power.

Greater efficiency resulting from the high temperatures when mercury is used can pay for higher initial cost of building such a plant even when coal is the fuel, Dr. Epstein said. Use of liquid sodium to cool valve seats on airplanes, trucks and some automobiles, he pointed out, is already common in the United States.

Revelation that the goal of future research in both England and America is a reactor circulating as liquid fuel a solution of uranium in liquid metallic bismuth was made by Drs. R. Hurst and J. Wright of the Atomic Energy Research Establishment at Harwell, England.

Fission products that "poison" the reactor, making frequent shutdown of reactors using solid fuel in a graphite lattice necessary, would be continuously withdrawn from a liquid fuel reactor.

Such an arrangement would combine the advantages of today's most promising reactors, in which the fuel is a water solution of uranium salts, with the high temperatures obtainable in an all-metal operation. Fused salts would remove interfering fission products in the process described by the British scientists.

Science News Letter, September 3, 1955

HORTICULTURE

Rotate Light Bulbs For Winter Plant Growth

► TO STEP UP growth of hothouse plants over short German winter days, plant growers have been using electric lights in the greenhouse to help out the sun.

By doing so, they have buried themselves under a maze of electric lamps and installations, incidentally running up large electric bills.

Facing the problem, a German scientist, Wilm Kind, reasoned it would be a lot simpler to use a few lamps that move around the greenhouse than to have separate lamps in every available space. Mr. Kind tried out his idea, mounting a pair of fluorescent lamps on a movable track suspended from the ceiling.

He found that the two lamps, driven by a small motor back and forth across the greenhouse, furnish ample and cheap artificial illumination for quicker plant growth.

For smaller installations, he places his two lamps on the ends of slowly rotating arms run by a small fan, with equally good results.

With this invention, Mr. Kind believes plants can be grown successfully and cheaply even in sunless cellars using artificial light.

Science News Letter, September 3, 1955



ROTATING HOTHOUSE LIGHTS — To grow hothouse plants more cheaply and efficiently during short winter days, a German scientist, Wilm Kind, devised a method of rotating light bulbs that gives good illumination using only a few bulbs.

PHYSICS

Boiling Water Measured By Singing of Kettle

► SCIENTISTS are catching up with what housewives have known a long time—you can tell about how hot a kettle of water is by listening to the sound of boiling.

In experiments to relate the sounds of boiling with temperature and the flow of heat from heater to liquid, three University of Illinois chemical engineers, J. W. Westwater, A. J. Lowery Jr. and F. S. Pramuk, boiled methyl alcohol at 148 degrees Fahrenheit, using a copper heating unit, and listened to what happened.

They found there are three separate stages in boiling, each with its typical sound pattern, depending on the temperature difference between the liquid and the metal heater, which is the kettle bottom in a kitchen.

First came "nucleate boiling," when there was repeated, systematic bubble formation at specific spots on the metal surface. This kind of boiling ceases when the temperature difference between liquid and heating surface is 85 degrees Fahrenheit.

From that temperature up to a difference of 130 degrees Fahrenheit comes "transition boiling," when bubbles form violently and at random over the copper heater. The boiling sound increases rapidly across the transition temperatures.

Beyond 130 degrees Fahrenheit, lies "film boiling," when the hot metal is blanketed in a film of vapor and the sound level is rather uniform.

As the liquid temperature increases, there is less heat transfer from the metal to the liquid, the scientists found. During film boiling, the heat transfer is very poor.

While the sound of boiling does tell about a liquid's condition, it does not increase steadily with the amount of heat transferred, but varies according to the temperature difference between the liquid and the heating metal, they report in *Science* (Aug. 19).

Science News Letter, September 3, 1955

TECHNOLOGY

Cool Villagers Party More Than Hot Neighbors

► FAMILIES in the 22-house "Air Conditioned Village," Austin, Texas, entertain four to five times as much as their non-air-conditioned neighbors, according to latest data collected by scientists of the National Institute of Home Builders, studying the effects of air conditioning on living habits.

The researchers fail to report whether the additional entertaining is done willingly, or whether friends and relatives just drop in to share the families' comfort.

The data show a house becomes a home when air conditioning enters. Families with teen-age children were at home together, during waking hours, for 24 hours a week. Families with teen-agers in non-conditioned homes stayed together only 14

hours a week. Whether the cool families will continue to stay home together, or whether this effect is temporary, is not yet known.

The air-conditioned families also slept more. Adults got eight hours at night, then napped an average of 45 minutes during the day. The children averaged nine and one-half hours at night, napped 90 minutes a day. Both adults and children got an average of at least an hour's sleep more than their hot neighbors.

The now-famous Austin Villagers have better meals than their warmer neighbors. This is because cool housewives cook better meals, and cool families have brisker appetites.

Although the 22 families are living in an oasis, surrounded by outdoor temperatures of over 100 degrees, they are not without some complaints:

1. They do not like the noise of some units.
2. They do not like units in which the fan turns off when the cooling unit is not needed. Continuously circulating air was found to be more comfortable.
3. They want fewer gadgets to tend.

Science News Letter, September 3, 1955

TECHNOLOGY

Blimps Are Link In Radar Network**See Front Cover**

► NEW LINKS in the radar network guarding North America are Navy ZPG-2W radar picket blimps carrying high-power airborne search radar, housed in the radome beneath the cabin, as shown in the photograph on the cover of this week's *SCIENCE NEWS LETTER*. Associated electronic equipment is carried inside cabin.

By carrying the radar several thousand feet in the air, the blimp's instruments can detect low-flying planes over the horizon long before surface radar equipment. This is because radar beams follow "line-of-sight," and do not bend over the horizon to follow the earth's curvature. Raising the radars thus widens their range.

The radars are made by General Electric's Light Military Electronic Equipment Dept., Utica, N. Y.

Science News Letter, September 3, 1955

ZOOLOGY

Aussies Use Reflectors To Track Kangaroos

► EARS OF KANGAROOS in Western Australia are being taped with reflector-tape while the animals are asleep, so that scientists can later check their night motion.

The tape in several different colors is stuck to light metal tags attached to the kangaroo's ears. Water at their drinking place is drugged to put the kangaroos asleep, during which time the tags are attached.

Science News Letter, September 3, 1955

IN SCIENCE

BIOCHEMISTRY

Drug Co-Discoverer Studies Rare Mosses

► DR. ALBERT SCHATZ, co-discoverer of streptomycin, is studying a group of rare mosses he believes may be the lonely survivors of vegetation that carpeted the earth in the dawn of time.

In the early days of the earth, the atmosphere was almost devoid of oxygen, an element modern plants must have to manufacture their food by photosynthesis. But these rare plants, called copper mosses, according to Dr. Schatz, appear to be able to manufacture food using sulfur, which was plentiful then, in the place of oxygen.

Before Dr. Schatz' investigation of the copper mosses, only a few forms of bacteria were believed to carry out sulfur photosynthesis.

Modern plants use oxygen found in water for photosynthesis. The copper mosses are thought to use the ill-smelling gas hydrogen sulfide which is structurally similar to water for their food manufacture.

These "fossil" mosses may come to play an important part in industry. Their preference for copper ores as a place to grow on, may mean that they can be used to locate hidden copper deposits.

The attraction of these mosses to copper ore is probably due to the occurrence of copper sulfur compounds in the ore, which furnishes a sulfur source for the fossil plants, said Dr. Schatz, director of research at the National Agricultural College, Doylestown, Pa.

Science News Letter, September 3, 1955

ASTRONOMY

Comet Discovered Near Pole Star

► A FAINT COMET has been discovered by an amateur astronomer in the constellation of Draco, the dragon, a stellar group that circles Polaris, the Pole Star.

The new comet was spotted by the Rev. Carl J. Renner of Castilia, Ohio, a member of the American Association of Variable Star Observers. Its magnitude is ten, too faint to be seen without a telescope.

The part of the constellation Draco in which the comet was found is nearly overhead and is close to Ursa Minor, the smaller bear. Both constellations can be seen circling Polaris throughout the year.

Its celestial position on Aug. 16 was 19 hours, 12.5 minutes in right ascension; 67 degrees, 33 minutes in declination.

Rev. Renner reported its motion as 5.6 minutes south southwest to Harvard College Observatory, Cambridge, Mass.

Science News Letter, September 3, 1955

IE FIELDS

STATISTICS

World Population Booms To More Than 2.5 Billion

► THE WORLD'S POPULATION is booming. Since the beginning of World War II, it has grown by almost one-third billion and now exceeds two and one-half billion. Put it down to more babies and fewer deaths.

A new record low death rate has been set by American wage earners and their families. For the first six months of 1955, it was the lowest in the nation's history.

Even for heart, blood vessel and kidney disorders, the death rate among the wage-earner group was below last year's, 344.9 per 100,000 compared with 347.1.

These birth and death figures come from Metropolitan Life Insurance Company statisticians in New York. For their millions of industrial policyholders, the death rate during the first six months of 1955 was 644.4 per 100,000 insured, compared with the previous low of 652.1 set last year.

The death toll from cancers in the insured group stayed at last year's level, about 129 per 100,000.

Birth rates in Europe, Japan and the Philippines have fallen to or below pre-World War II levels, except for France and Norway. In the United States and other English-speaking countries outside Europe, notably Canada, Australia and New Zealand, the birth rates have stayed a third or more above the prewar levels.

Less well-developed areas of the world continue to have high birth rates.

In the United States the margin of births over deaths has increased population at a rate of about one and one-half percent a year. The rate of increase has been even greater in many countries in Asia and Latin America. These countries, the statisticians point out, have potentialities of rapid population growth for many years to come.

Science News Letter, September 3, 1955

MARINE BIOLOGY

Fiddler Crabs Show Neurotic Symptoms

► FRUSTRATION RESULTS in crazy, mixed-up sand fiddlers, experiments by a South African zoologist indicate.

When frustrated in his romantic designs, or when caught between desire and fear, the male sand fiddler takes up a pointless "displacement activity," in which he goes through the motions of feeding without eating anything.

This is reported by Helen R. S. Gordon of the University of the Witwatersrand, Johannesburg, in *Nature* (Aug. 20).

In normal feeding, the male fiddler de-

liberately stuffs mud into his mouth, using the smaller of his claws. Food material in the mud is sorted out by the mouth parts, and the worked-over mud is dropped to the ground in pellets. But when a female refuses his advances, all this changes.

Faced with a female who is not charmed by the beckoning of his handsome larger claw, the male fiddler petulantly begins to feed "nervously," scooping more often than usual and far less deliberately. The rejected male actually gets a negligible amount of food to his mouth, so little that no pellets are formed.

This temper tantrum may go on until the female shows more interest or until another passing female catches his roving eye.

Male fiddlers also show this "displacement activity" when they are confronted with stronger males bent on a fight.

The only reported case of displacement activity by a female came when four males completely surrounded a lone female in a laboratory tank. Boxed up against the wall, she was cut off from the safety of her burrow. She tried time and again to scale the wall, but always fell off.

Caught in this dilemma, she began stuffing nothing into her mouth busily.

Science News Letter, September 3, 1955

ARCHAEOLOGY

Spanish Chain Mail Links Found in Indian Mound

► THREE JOINED metal links, thickly coated by decades of corrosion, have been recovered from the side of an Indian mound, apparently the undisturbed dwelling site of prehistoric Indians on the Rio Puerco's right bank in New Mexico.

The links, which averaged about a quarter inch in external diameter, were probably part of a chain mail suit of armor worn by a Spanish soldier in the conquest of New Mexico.

How it happened to be in an apparently undisturbed layer of refuse in a pottery mound dating back to a time long before the coming of the Spaniards is not known. Drs. Bruce T. Ellis of the Laboratory of Anthropology and Arthur Woodward of Altadena, Calif., state in *El Palacio* (May-June).

Some chain mail used in northern Mexico during the late 17th century was made in Mexico by armorer-blacksmiths, but this was coarser, with links as large as one-half inch in diameter. Finer mail was more likely to have been made in Europe.

So far as is known, no other articles of European origin have been found in this pottery mound. In the case of the chain links, the archaeologists suggest the mail may have been worn by a settler of the region as protection against marauding Navahos as late as the 18th or early 19th century. If the settler snagged his coat of mail on a mesquite bush growing on the pottery mound, links may have lain there until a rat or other burrowing animal carried it under ground to the layer.

Science News Letter, September 3, 1955

NUTRITION

Substance 300 Times As Sweet as Sugar

► SWEETHEARTS of the next generation may be telling each other they are "sweet as stevioside." This crystalline chemical from the leaves of a wild Paraguayan shrub has been found to be 300 times sweeter than the usual standard of lovers, table sugar.

In the meantime, unromantic scientists of the National Institute of Arthritis and Metabolic Diseases are subjecting this super-sweet compound to a series of tests to learn its chemical structure and to discover any practical applications for it.

Dr. Hewitt G. Fletcher Jr. of the National Institutes of Health, Bethesda, Md., reports that stevioside is made up of very large molecules containing only three ingredients, carbon, hydrogen and oxygen. Included in each large molecule are three sub-molecules of glucose, the common cane sugar.

Stevioside does not have the bitter after-taste of saccharin, and apparently causes no ill effects on experimental animals receiving it as food. For the diet-conscious, stevioside seems to have little or no food value.

Source of stevioside is a small shrub, *Stevia rebaudiana*, which grows wild in Paraguay and a few near-by areas in Argentina and Brazil. It was seriously considered as a sugar substitute in England during World War II. Difficulty in cultivating the plant and cheaper costs of saccharin, however, have kept stevioside a mere curiosity up to now.

Dr. Fletcher holds out hopes that stevioside may find eventual use in medicinals or in their synthesis. His report appears in *Chemurgic Digest* (July-Aug.).

Science News Letter, September 3, 1955

ANIMAL NUTRITION

Cows Need Vitamins When Drought Strikes

► CATTLEMEN plagued with cattle abortions and sickly new calves on drought-ridden ranges can cut their losses by addition of a new form of vitamin A to supplementary feed.

Pregnant cattle deprived of green pasture in drought areas develop vitamin A deficiency, which leads to trouble at calving time. To test the effect of synthetic vitamin A feeding, Robert F. Miller, farm adviser of Tulare County, Calif., gave bred heifers Vitamin A in Gelatin, developed by Chas. Pfizer & Co., Inc.

From a group of 43 two-year-old cows fed vitamin A to supplement a dry diet, there were 43 full term calves, with no abortions and no retained placentas.

With a group of 128 first-calf heifers given the vitamin, 83% of the calves were born alive, about 15% higher than on the same ranch in previous years, Mr. Miller reports in *Western Livestock Journal* (Aug.).

Science News Letter, September 3, 1955

AERONAUTICS

Civil Jet Age Is Upon Us

Military experience with jets is about to pay off for the air traveler as jet and turboprop liners are rushed into production.

By EDWARD HOUSMAN

► THE WHISTLE of shiny new turboprop airliners cutting across American skies heralds the beginning of the civilian jet age in this country.

Lessons learned in the design of military jets are about to pay off for the traveler in far greater speed and comfort in flight. Imagine taking off from Paris after a light continental breakfast and landing in New York in time for an American ham-and-eggs breakfast.

When you debark, the only meal you will be able to buy is breakfast, for the plane will land at approximately the same time it took off, sun time. The aircraft will travel as fast as the earth spins at the flight latitude, or at about the speed of sound. The sun will seem to remain in the same spot in the sky during the whole transatlantic flight.

This is not all fancy. Speeds close to that will soon be possible with jet airliners now being readied for production.

The Vickers Viscount turboprop airliner, now in service on Capital Airlines, is the stepping stone to the jet age. The turboprop engine is a jet, but not in the ordinary sense. The blast of jet air stays mostly inside the engine and is used to spin a turbine that spins the propeller. Harnessing the jet gases to a propeller allows greater fuel economy at lower altitudes and medium speeds. On the other hand, the turbojet engine used on modern fighters propels the plane by exhausting hot gases to the rear, pushing the plane forward.

Many Major Contenders

No pure turbojet-powered aircraft are in commercial service today, but the race is on among aircraft manufacturers of the world to get a civil turbojet liner into satisfactory production form.

Here are the major contenders:

The new Comets, models 2, 3 and 4, now being tested in England, are variations of the Comet 1, the first and only commercial jet to go into passenger service. Unfortunately, the Comet 1 was grounded a little over a year ago after crashes caused by weakness of the pressurized fuselage. The British are pinning their hopes on the latest model, the Comet 4, which is expected to be ready for airline use in 1958. Designed by The de Havilland Aircraft, Ltd., the plane will carry 58 passengers at a speed of 500 miles an hour.

In the United States, two major jet liners have been proposed. The Douglas Aircraft Company will produce a huge four-engine plane, the DC-8, the over-water version of which is expected to weigh 257,000 pounds gross. The largest presently used airliner, the Boeing Stratocruiser, weighs 145,000 pounds.

First test flights for the DC-8 are scheduled for December, 1957, and deliveries to airlines should begin in 1959, the manufacturer said. Cruising speed of the DC-8 will be greater than 550 miles an hour. The swept-wing jet will be able to make non-stop trips to Europe regardless of headwinds and fly from Los Angeles to New York in four and one-half hours. It will carry 80 to 125 passengers.

The second U. S. jet, Boeing's 707, is in a more advanced stage of development. A prototype has been flown almost 200 hours in tests, and a military version, the KC-135, is in production as an Air Force tanker for aerial refuelings. The Air Force has just given Boeing Airplane Company the go-ahead on producing the 707 for civilian use. Previously, it was feared that military contracts would hold up 707 production.

This might have given the lead in the jet liner race to British Comets.

Boeing 707's, which will cruise at 550 miles an hour and carry 80 to 135 passengers, are expected to be delivered early in 1957. If this occurs, the four-jet plane will be ready for service a year before any of its rivals.

France is entering the jet race with the Caravelle, a 70-passenger airliner expected to cruise at more than 480 miles an hour. Its two jets are near the tail instead of on the wings. Its designers claim tail jets will reduce the noise reaching passengers.

Russia's Progress Unknown

Next to nothing is known, officially at least, about Russia's progress in the commercial jet field. Recent air shows, however, have demonstrated that the Soviets have advanced jet engines on military craft that could well power commercial planes.

The proposed jets will be used only for long-distance, high-altitude flights where the time saved in flight becomes significant and where jet engines can work at top efficiency most of the time. This is the view of Gordon R. McGregor, president of Trans-Canada Air Lines, and most observers in this country agree.

Mr. McGregor sees the following airline pattern for the future: turboprops for short- and medium-range flights; a new engine,



JET OF FUTURE—This transparent view of a model of a commercial jet shows the kind of plane we may be using soon. No turbojets are in commercial service today, but the production race has started.

the by-pass, for medium long-range hops, and the conventional jet for long-range duty. The piston engine used almost exclusively in today's commercial airplane engines is presumably on its way out as the dominant power plant.

The by-pass engine, predicted for medium long-range flights, is now in the experimental stage, but experts believe that the revolutionary power plant shows great promise.

The only commercial by-pass engine in advanced development stage today is the Rolls Royce Conway of Great Britain, but almost nothing has been released about its performance. It is proposed as the power plant for the VC-7, a British airplane now being developed.

For improved economy at medium-high altitudes and high speeds, the by-pass engine draws more air into the intake than is ordinarily used for burning jet fuel. The excess air is routed around the combustion chamber into the exhaust. The by-passing air slows down the exhaust gases, making the engine more efficient for airplane speeds greater than can be obtained economically in a turboprop, but slower than top jet efficiency.

Efficiencies Compared

The ideal by-pass range is from 500 to 600 miles an hour, precisely the speeds at which airlines are now aiming.

Efficiency of propeller driven planes, such as the turboprop, is best at low speeds, then drops to nearly zero near the speed of sound. Jet efficiency increases directly with speed and shows best performance beyond the sound barrier. The by-pass engine's peak efficiency lies somewhere between the two types. It offers fuel economies of from five percent to ten percent over the jet and is quieter.

For shorter hops, the turboprop engine seems most promising. It offers greater speed than comparable planes driven by piston engines, and has less rumble and engine noise.

In the turboprop field, the 44-passenger 320-mile-an-hour Vickers Viscount has a considerable lead, and its successful use by European and Canadian airlines has spurred development of other turboprop models.

Turboprops Planned

There is also the Bristol Britannia, now being tested in Britain, which should be available next year. The Dutch have developed the Fokker F-27 which is smaller than the Viscount.

In the United States, the Lockheed Electra turboprop liner has been ordered by American Airlines, apparently in answer to Capital's new Viscount fleet. The Electra will probably be powered by four Allison 501 engines. Latest data set the Electra's speed at 414 miles an hour at 25,000 feet with 80,000 pounds. It will carry 64 to 80 passengers and should be coming off the production line in 1958.

Noise is a major setback in the jet's use, the jet engine being one of the loudest machines yet devised by man.

In the air, the engines would probably not bother passengers because at high-flight altitudes the air is thin and cabins will be well insulated.

At supersonic speeds, which are predicted in from 20 to 30 years, jet noise for passengers will be no problem, since the plane would travel faster than the sound it makes, leaving the noise behind it.

If you have ever heard a jet fly low over you, you can imagine what an annoyance such engines might be to persons at or near an airport. Jets idling on the runway would also kick up a mighty roar.

Noise Reduction Schemes

Several recent schemes have been developed to reduce the noise problem. One is a portable screen that, when placed at the proper distance from the jet's exhaust cone, considerably reduces noise toward the roar.

Another proposal employs a collapsible sieve attachment for the engine exhaust. It changes the jet noise from a low roar to a squeal, much of which is of too high a pitch for human ears to catch. When the plane reaches cruising altitude, the sieve folds like a collapsible drinking cup, permitting full use of jet power. (See SNL, July 16, p. 39.)

Jets, as a rule, need longer runways than piston-engined planes, but most of the planes being designed could operate from many of today's modern fields safely.

Artificial control of airflow over the wings, called boundary layer control, is seen as the most promising way to shorten landing and take-off runs of future jets. One method employs blowers and suction.

Fuel Consumption High

Fuel is also a problem, especially with the jet. The Super-Constellation, equipped with today's efficient piston engines, needs about 22,000 pounds or almost 4,000 gallons of gasoline to make a non-stop transatlantic flight.

Turboprops drink even more fuel, but of lower grade. By-passes burn even more, and the turbojet tops the list in fuel consumption rate. For this reason, transatlantic jets will have to be giants like the Douglas DC-8.

Airlines in the United States are now "getting scared" as one official in the Civil Aeronautics Administration put it. They fear that competition from abroad and importing of Viscounts by one airline will upset the present passenger balance. Airlines and aircraft manufacturers are now maneuvering for position as they enter the stretch in the jet race. Experts are betting heavily that the outcome will be widespread jet service on major airlines in the next ten years.

Beyond that time, only the most reckless will venture a guess. Perhaps rocket service—perhaps even atomic aircraft lie above the future's horizon.

METEOROLOGY

Antarctic Blizzard Hits Weather Stations

► WEATHER OBSERVATION STATIONS in Antarctica have been destroyed by a blizzard, the director of the Australian Antarctic Division, P. G. Law, reported in Sydney, Australia.

The weather stations were automatic and required no attention, he said. They were valuable because they were placed more than ten miles from Mawson in MacRobertsonland, helping to give a broad picture of the Antarctic weather that could not be gained from one station alone.

Science News Letter, September 3, 1955

SURPLUS TOOL BARGAINS

SAVE UP TO 50%

41 SURPLUS TWIST DRILLS
For hand or electric drills. Brand new genuine hardened carbon tool steel drills from 1/16 through 1/2". Each drill designed and tempered to give up to 1800 drillings through steel, aluminum, iron, wood, plastic. Sells in the stores for up to \$6. Set of 41 drills \$2.00.

\$2

5 PLIER SET

For jewelers, optical workers, hobbyists. These superb German instruments are of drop-forged, high-quality tool steel. All ground and smooth working joints with just right tension, jaws meet perfectly to safely and securely hold most delicate objects. Each plier is 4" long and a veritable gem of precision and strength.



All 5 for \$3.50

75¢ EACH

Take The Work Out Of Using Screws With The Sensational

Supreme POWER DRILL SCREWDRIVER ATTACHMENT

Fits all Drills 1 1/4" and Larger

Clamp this new unit in your drill—just like a bit, and see how fast and easy it runs every screw up tight! Light, compact and tool-proof, this attachment is actually a screwdriver blade with a built-in clutch. The spinning drill chuck drives the screw only when you press with drill. Release your pressure, and the friction clutch releases the screw end. Changeable blades included for either slotted head or Phillips screw, with Allen wrench and complete instructions. For screws up to 3/16" (three sixteenths) diameter... only \$4.95. Also Heavier Duty model for screws to 1/4" diameter... only \$6.95.

ORDER ON 10-DAY TRIAL GUARANTEE
All surplus and direct imports. Sold on money back guarantee. Send check or money order with name and address. We pay postage. If C.O.D. you pay postage and C.O.D. charges. Money back guarantee protects you fully.

SCOTT-MITCHELL HOUSE, Inc.

Dept. 2409, 611 Broadway, N. Y. 12

Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

THE AGRICULTURAL REGIONS OF THE UNITED STATES—Ladd Haystead and Gilbert C. Fite—*University of Oklahoma Press*, 288 p., illus., \$4.00. Pointing out the reasons why the greatest industrial nation in the world should also have the largest farm output and be one of the most varied in agricultural production, as well as giving practical information to the farmer or would-be farmer.

AUTOMATIC RECORD CHANGER SERVICE MANUAL WITH TAPE RECORDER SERVICE DATA, Vol. 6, 1953, 1954—*Howard W. Sams*, 189 sections, illus., paper, \$3.00. Providing service data on 1953 and 1954 models of record changers.

BIOFLAVONOIDS AND THE CAPILLARY—Gustav J. Martin and Albert Szent-Györgyi, Conference Co-Chairmen—*New York Academy of Sciences, Annals*, Vol. 61, Art. 3, 100 p., illus., paper, \$3.00. This series of papers is the result of a conference held by the section of biology of the N. Y. Academy of Sciences, Feb., 1955.

BITUMINOUS PAVING MIXTURES: Fundamentals for Design—Lloyd F. Rader and others—*Highway Research Board, Bulletin* No. 105, 45 p., illus., paper, 75 cents. For the engineer who is engaged in designing and constructing bituminous-paving mixtures.

CHEMISTRY OF THE SOLID STATE—W. E. Garner, Ed.—*Academic Press*, 417 p., illus., \$8.80. Presenting the facts and theories concerning the solid state in a form useful for physical chemists.

ELECTRO-MAGNETIC MACHINES—R. Langlois-Berthelot, translated and revised in collaboration with Lieut.-Colonel H. M. Clarke, with foreword by C. W. Marshall—*Philosophical Library*, 535 p., illus., \$15.00. Dealing with questions common to the different classes of transformers and rotating machines.

FROM ZERO TO INFINITY: What Makes Numbers Interesting—Constance Reid—*Crowell*, 145 p., \$3.00. Telling in an interesting fashion the story of the first ten natural numbers.

GEOCHRONOLOGY: With Special Reference to Southwestern United States—Terah L. Smiley, Ed.—*University of Arizona Press, Physical Science Bulletin* No. 2, 200 p., illus., \$1.50. A brief survey of the major methods used in dating prehistoric events in southwestern United States.

MATH IS FUN

By Joseph Degrazia, Ph.D.

Here is a treasury of brain-teasers. You need not be a mathematical genius to solve these problems and puzzles. What you need is to know how to THINK LOGICALLY—how to REASON. This is practically a "course" in applied logic and reasoning—besides being an immense amount of fun that will keep you absorbed for many hours. You will find not only that MATH IS FUN, but also that learning math can be fun!

CONTENTS: Trifles—On the Borderline of Mathematics—Faded Documents—Orphee—How Old Are Mary and Ann?—Wolf, Goat and Cabbage—And Other Odd Coincidences—Clock Puzzles—Trouble Resulting from the Last Will and Testament—Speed Puzzles—Railroad Shunting Problems—Agricultural Problems—Shopping Puzzles—Whimsical Numbers—Playing with Squares—Miscellaneous Problems—Problems of Arrangement—Problems and Games—Solutions.

Many delightful and helpful illustrations
Solutions where needed

Large Book • 159 Pages • 159 Hours of Fun
\$2.75 Postfree • 5-Day Money-Back Guarantee

EMERSON BOOKS, INC.
Dept. 565-K, 251 W. 19th St., N. Y. 11

States, intended to be of technical value to all investigators concerned with temporal problems, particularly those falling within the late Pleistocene and recent geologic epochs.

HORSES—Helen Jill Fletcher—*Gabriel*, 64 p., illus., paper, 25 cents. The story of the horse from prehistoric times to the present, told for young people.

HYDRODYNAMICS: A Study in Logic, Fact, and Similitude—Garrett Birkhoff—*Dover*, 186 p., illus., cloth \$3.50, paper, \$1.75. Originally published by Princeton University Press in 1950.

IMPROVED LUNAR EPHEMERIS 1952-1959: A Joint Supplement to the American Ephemeris and the (British) Nautical Almanac—Prepared jointly by the Nautical Almanac Offices of the U. S. A. and the United Kingdom—*Govt. Printing Office*, 422 p., paper, \$2.25.

INTRODUCTORY NUCLEAR PHYSICS—David Halliday—*Wiley*, 2 ed., 493 p., illus., \$7.50. A chapter has been added on the elements of wave mechanics and some formula derivations have been included in this edition.

LOWER CAMBRIAN PTYCHOPARIID TRILOBITES FROM THE CONGLOMERATES OF QUEBEC—Franco Rasetti—*Smithsonian, Smithsonian Miscellaneous Collections*, Vol. 128, No. 7, 35 p., illus., paper, 60 cents. Fifteen species, nine of them new, are described, and three new genera are established.

MAGNETIC MATERIALS IN THE ELECTRICAL INDUSTRY—P. R. Bardell—*Philosophical Library*, 288 p., illus., \$10.00. Seeking to bridge the gap between an academic study of the properties of magnetic materials and the limited treatment of the subject possible in most textbooks for engineers.

MONOGRAPHS ON TOPICS OF MODERN MATHEMATICS: Relevant to the Elementary Field—J. W. A. Young, Ed., with introduction by Morris Kline—*Dover*, 416 p., cloth \$3.95, paper \$1.90. Republication of the first edition published by Longmans, Green in 1911.

MORE MODERN WONDERS AND HOW THEY WORK—Captain Burr W. Leyson—*Dutton*, 2 ed., 215 p., illus., \$3.50. Giving the inside story of guns, the atomic submarine, UHF television, and other mechanical achievements of the 20th century.

NON-EUCLIDEAN GEOMETRY: A Critical and Historical Study of Its Developments, THE SCIENCE OF ABSOLUTE SPACE, THE THEORY OF PARALLELS—Roberto Bonola, John Bolyai and Nicholas Lobachevski—*Dover*, 389 p., cloth \$3.95, paper \$1.90. Three major contributions to non-Euclidean geometry, in English translation.

PHOTOGRAPHIC PRODUCTION OF SLIDES AND FILM STRIPS—*Eastman Kodak Co.*, 52 p., illus., paper, 50 cents. Designed to help the photographer carry out the necessary steps to transform flat copy and photographs to a filmstrip or slide sequence in either black-and-white or color.

THE REGULATION OF HUNGER AND APPETITE—Franklin Hollander, Ed.—*New York Academy of Sciences, Annals*, Vol. 63, Art. 1, 144 p., illus., paper, \$3.00. Dealing with the question, "Why do we eat, or fail to eat, even in spite of nutritional requirements?"

SEE THROUGH THE SEA—Millicent Selsam and Betty Morrow—*Harper*, 48 p., illus., \$2.50. Telling children about creatures living in the

sea, from tidal animals to those that live in darkness at the ocean bottom.

SEVEN MEN AMONG THE PENGUINS: An Antarctic Venture—Mario Marret, translated from the French by Edward Fitzgerald—*Harcourt, Brace*, 269 p., illus., \$4.50. Written by the leader of an expedition that went to the Antarctic to record weather conditions, to gather information about the habits of the Emperor penguins, and to test man's ability to withstand the rigors of the Antarctic night.

STICKS AND STONES: A Study of American Architecture and Civilization—Lewis Mumford—*Dover*, 2 ed., 238 p., illus., cloth \$3.00, paper \$1.50. This book attempts to relate individual structures to their urban site or their setting in the rural landscape.

TABLES OF THE CUMULATIVE BINOMIAL PROBABILITY DISTRIBUTION—Staff of the Computation Laboratory—*Harvard University Press*, 503 p., \$8.00. For statisticians interested in problems relating to sampling and quality control.

THEORY OF GROUPS OF FINITE ORDER—W. Burnside—*Dover*, 2 ed., 512 p., illus., cloth \$3.95, paper \$2.00. A republication of the second edition published in 1911.

WINGS IN YOUR FUTURE: Aviation for Young People—Leo Schneider and Maurice U. Ames—*Harcourt, Brace*, 151 p., illus., \$2.75. A readable book for children with experiments they can perform to help them understand the basic principles of flight and jet propulsion, and other aspects of aviation.

Science News Letter, September 3, 1955

SURGERY

Give Shot in Arm For Nose Surgery

➤ A SHOT in the arm plus soothing music relieves the strain of undergoing operations on the nose, three Chicago ear, nose and throat specialists report.

The shot of alcohol is literally given in the arm—by slow drip into a vein. The amount is regulated to produce a "feeling of well-being," but to stop short of inebriation.

It is particularly helpful for operations on teen-agers and the elderly, or those with other illnesses besides the nose condition for which surgery is needed.

After the alcohol, a local anesthetic is given and the operation proceeds while the patient listens to classical music through earphones.

This modern method of the centuries-old use of alcohol to help a patient through an operation is reported by Drs. Maurice H. Cottle, George F. Fisher and Roland M. Loring of the Illinois Masonic Hospital, Chicago, in the *Journal of the International College of Surgeons*.

Science News Letter, September 3, 1955

RADIO

Saturday, Sept. 10, 1955, 5:00-5:15 p.m. EDT

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS Station.

Miss Margaret Patterson, executive secretary, Science Clubs of America, and Joseph Kraus, coordinator, National Science Fair, will discuss "Science for Youth."

WILDLIFE

Flood Tides Destroy 90% of Marsh Hen Hatch

► HUNTERS along the Atlantic coast will be getting fewer marsh hens this year. Unusually high tides took a heavy toll of the nesting clapper rail, or marsh hen, population this year, making it necessary to shorten the season and slice the bag limit on this game bird along the Atlantic flyway.

An estimated 90% of the first hatch of clapper rails were destroyed by flood tides along the Virginia and New Jersey coasts, the U. S. Fish and Wildlife Service has reported. A successful second hatch later was not enough to make up the great loss.

Along the Atlantic flyway, the 1955-56 hunting season for rails has been cut from 70 to 60 days and the daily bag limit pared from 15 to 10 birds. Last year's regulations still stand for the other flyways.

This ruling holds for all species of rails and gallinules, except the sora, or rail bird. All four flyways will have a daily bag limit of 25 of these birds.

The clapper rail builds its nest on high spots within salt marshes. Its nine to 12 eggs are at the mercy of spring tides which may flood over the nesting areas, as they did this spring. Although they can swim for a short time, adult clappers will soon drown in flood water unless they can reach high ground.

Hunters usually set out for "marsh hens" during fall flood tides, when the high water flushes the birds from their hiding places in the marsh.

Science News Letter, September 3, 1955

ENTOMOLOGY

Granular Insecticides Cut Harmful Residues

► DANGER OF FOODS being poisoned with insecticide residues can be cut drastically by using the chemicals in granular instead of semi-liquid spray form, research by the U. S. Department of Agriculture and the Iowa Agricultural Experiment Station indicates.

Testing effects of insecticides on the destructive European corn borer, experts found that granular forms left 100 to 200 times less residue on corn leaves than did emulsion sprays, while doing as good or better a job in controlling the pest.

Toxic insecticide residues can accumulate in the body fat of livestock or be found in the milk of dairy cows feeding on treated plants.

The insecticides DDT, EPN, heptachlor and malathion have been tested in granular forms, which are made by "fastening" the chemicals to a clay-like material, attapulgite, or to tobacco particles. Unlike sprayed droplets that stay where they fall, the granular insecticides do not cling to the leaf surfaces but tend to slide down into the leaf whorls and junctures of leaf and stalk, where young corn borers do most of their feeding.

Science News Letter, September 3, 1955

SAVE ON PALLEY'S
NEW & SURPLUS VALUESNEW 100-200-300 POWER
MICROSCOPENOW ONLY
895Compares to
instruments selling
up to \$75.00

An UNSURPASSED VALUE! Has fine ground and polished achromatic lenses. Precision ALL-METAL construction - this is NOT A TOY! The triple, revolving objective lens turret will allow you to select a 100X - 200X or 300X magnification. Has right or left hand rack and pinion adjustment for smooth, precise movement. Body inclines 90°. Adjustable plano sub-stage mirror. Complete in sturdy, dovetailed hardwood case. Your satisfaction FULLY GUARANTEED or money refunded.



NEW ARMY SURPLUS 178mm f:2.5 CAMERA LENS

Originally designed for use on the K-21 and K-24 Aerial Cameras. A genuine EASTMAN AERO EKTAR 178mm lens. Has speeds from f:2.5 to f:16. Focal length is 7 inches. This amazing lens is NEW - in original can. Guaranteed perfect condition. Excellent for Color or Black and White. Exceptionally fine for night work or in poor light conditions. Comes with 2 filters - 1 Polarized (for haze) and 1 yellow, plus a filter adapter, a lens heater for high altitudes and a lens dust cap. Can be adapted to 35 mm or Speed Graphic Cameras as a Telephoto lens (see below).

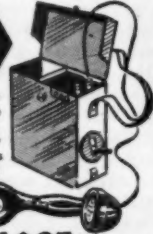
SPEED GRAPHIC ADAPTERS for above lens -
Includes Lens Board, Extension Tube and Bed Support.2-1/4x3-1/4" **2175** 3-1/4x4-1/4" **1875**
4x5" **1475**

ARMY PANORAMIC SCOPE

Originally used as a gun sighting scope on tanks. Objective head lens revolves through 360° and tilts through an angle of approx. 30 degrees. Tube assembly contains 11/16" x 3" dove prism. Eye piece is 1" Kellner and eyepiece assembly has a 90° Roof prism. Has crosshair reticle. **595**
Approx. 4 power. Use for range-finder, view-finder.

GOV'T SURPLUS
SIGNAL CORPS EEB
FIELD PHONE

Easy to operate. A private phone or intercom system. Use any place that portable two-way communication is desired. Gives clear reception up to 15 miles. Operates on two standard batteries. Several phones may be used on the same line. Set contains a ringing generator, leather carrying case and phone. Each set reconditioned and checked-out. . . . price each **1495 EA.**
COMPLETE CIRCUIT - Set of two . . . **2950**

MODEL GF-II and RU-16
RADIO TRANSMITTER
AND RECEIVER

A tremendous Government Surplus Bargain! ALL NEW in original box. Consists of a type CW-5203A Transmitter - 2000 to 9050 KC, a CW-4051A Receiver - 195 to 13575 KC range, plus all transmitter and receiver coils and boxes. A Dynamotor-Filter unit, Antenna Relay, Transmitter Control Box, Receiver Switch Box, Receiver Remote Tuning Control, plus all tubes and spacers. Complete and ready to operate on 12 volt current. Has 71 page manual and wiring diagrams. Made by Western Electric for U.S. Navy. Quantity limited - Order NOW! **9950**

PALLEY SUPPLY CO.

2263 E. VERNON AVE., DEPT. 14J
LOS ANGELES 58, CALIF.IMPORTED 1500X
RESEARCH
MICROSCOPE**\$18950**Compares to
instruments selling
up to \$750For BACTERIOLOGY -
HISTOLOGY - PATHOLOGY
BIOLOGY - BOTANY - ETC.

Top Quality, professional instrument. Has a triple revolving turret with three precision ground and polished achromatic objective lenses - 10X, RPX and 100X oil immersion. Plus three Huygenian eyepieces of SX, 10X and 15X giving up to 1500 power magnification. Has a sturdy, lifetime metal body which inclines through 90° for micro-photography. Rack and pinion control. Fine focusing adjustment. Large, 120 mm x 113 mm square stage which holds slides up to 3"x2". Sub-stage has an Abbe two-lens divisible condenser with iris diaphragm and rack & pinion motion. Complete in a fitted professional type carrying case with lock and key.

Satisfaction GUARANTEED or Your MONEY REFUNDED!

NEW ARMY SURPLUS 178mm f:2.5 CAMERA LENS

ONLY
6950

35 MM ADAPTERS FOR ABOVE LENS -
Complete - no other parts to buy. Will focus from 8 ft. to infinity - setting marked on the mount.
LEICA - CONTAX SED - EXACTA . . . **8950**
CONTAX 2A . . . \$189.50 HASSALBAD . . . \$139.50

SELF-CONTAINED
VICKERS
HYDRAULIC
TRANSMISSION

Gives Constant Torque at all speeds with a variable volume, reversible piston pump which supplies a piston type hydraulic motor. Has 2 H.P. automatic pressure dash pot for smooth control. Power output RPM is 0 to 1/3 input RPM in both directions. Input RPM is 1800 PSI continuous - 4000 RPM intermittently. Ideal to use for Drives, Lifts, Duplicators on Mills, Conveyors, Small Cars, etc. . . . **4450**
A War Surplus Bargain . . . Order Now

4" SPLINE SHAFTS for power input and take-off on above transmission. Per pair . . . **250**

INPUT and TAKE-OFF PLATE ASSEMBLY
To adapt above transmission to a pulley drive. Has self-lubricating, high speed bearings. 1/2" keyway shaft. **ONLY 2000**
Price per set . . .

180° OFFSET DRIVE

Excellent for use where tremendous power at low take-off RPM is desired. Has 6 gears, rotating on self-lubricating, high speed bearings. 85 to 1 gear ratio. Shafts are 1-1/4" x 3/8" diameter. New Surplus! **NEW 1295**

12 Pc. IMPORTED FILE SETS

In demand by Technicians, Model Makers, Repairmen, Hobbyists, etc. Made of finest quality, tough file steel. Specially hardened and accurately machined for precise filing. Set of 12 assorted shapes. **295**
A \$5.00 Surplus Value . . .

0-30 AMMETERS
NEW! Made to rigid Government Specs. . . **Only 395**

ORDER FROM THIS AD - Pay by Money Order or Check. P.O.s accepted from well rated D&B firms. 1/2 deposit with all C.O.D.s. Prices are F.O.B. our warehouse in Los Angeles.

CYTOLOGY

Life Secrets Sought In Ameba Reproduction

► BY RIGIDLY CONTROLLING the reproduction cycle of the one-celled ameba, scientists at the University of California at Los Angeles hope to unlock some of life's secrets.

Dr. Thomas W. James and associates in the zoology department have found that, by altering daily temperature of the water in which amebas live between 62 and 76 degrees Fahrenheit, the tiny animals will reproduce once a day. The reproduction cycle is then so regular that the scientists can predict with considerable accuracy when one ameba will become two.

As successive generations expand in numbers, some of them may vary in the reproduction cycle by as much as three hours, but the majority closely adhere to the timetable.

"Under these controlled conditions, we may be able to learn the exact proportions of vital chemicals which are necessary to bring about cell division," Dr. James said. "Such information may tell us something about the origin of this process which is characteristic of all living matter. It may also be basic to a better understanding of normal and abnormal tissue growth in human beings."

Science News Letter, September 3, 1955

AGRICULTURE

Onion Matures Early And Resists Fungus

► AN ONION that matures early, resists fungus disease and does not form seeds prematurely has been developed jointly by the U. S. Department of Agriculture and the Texas Agricultural Experimental Station in south Texas.

Seeds of the new onion, Early Crystal 281, will be available for commercial planting this fall. It is resistant to pink root fungus and gives a low percentage of splitting.

Because of its early maturing feature, it will probably find greatest use as an early marketing crop, with Eclipse onion or similar variety following as the main crop.

Science News Letter, September 3, 1955

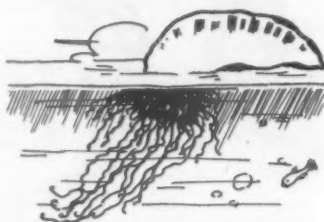
TABLETS—To Your Order!

Take advantage of our facilities for making small runs of tablets (non-medical), customer's formula . . . Tablets made of reagent chemicals for laboratory procedures . . . for dispensing solid chemicals in small amounts rapidly and accurately. These can be great time savers, with increased accuracy.

What tablets could you use to advantage?

Write for quotations, without obligation.

R. P. CARGILLE LABORATORIES, INC.
117 Liberty Street, New York 6, N. Y.



Beehive of the Sea

► LOOKING AT the gorgeous hue of a Portuguese man-of-war washed up on a beach by the wind and perhaps still smarting from a sting if you walked barefooted over a tentacle, you might call it a beautiful but dangerous individual.

If you did, you would be wrong.

Handsome it is, and dangerous, for enough of its poison can kill a full grown man. But the Portuguese man-of-war is not an individual! It is a whole colony of different individuals, living together for mutual aid, with each performing its own task for the good of the whole.

Substitute a container of living tissue for the artificially made hive, and you might consider the man-of-war to be a sort of bee colony with its queen, drones and workers each doing their special task.

The colony starts originally from a single jellyfish-like individual, the medusa, which begins to bud off new individuals. But instead of swimming off separately, these remain attached to one another and grow into specialized forms.

The large "sail" that protrudes above the water, containing a gas that keeps the colony afloat, represents one individual. The tentacles, which may extend 60 feet from this float, contain other individuals who "specialize" in feeding, and others who do the stinging for the colony.

Some members of the "hive" are equipped with sensory cells and do the "feeling" for the group, while still another kind are concerned only with reproduction.

The Portuguese man-of-war has no means of locomotion except its gas-filled sail. It can submerge itself, however, by releasing some of the gas from the bladder through a special pore. To come to the surface again, a fresh supply of gas is excreted to refill the sail.

Science News Letter, September 3, 1955

Growing vegetables are thirsty plants, drinking up three to nine inches of water a month.

CHEMISTRY

Speed of Sound Used To Analyze Chemicals

► THE SPEED of ultrasonic waves measured in alcohols, ethers, esters and other liquid organic chemicals has given scientists a new tool for chemical analysis.

Studies showing a way to calculate molecular weight, surface tension and viscosity, three important properties of any liquid, from the velocity of sound measured in that liquid have been published by Dr. Dudley Thompson, associate professor at Virginia Polytechnic Institute, Blacksburg, Va., and N. N. Bakhshi, research assistant in the department of chemical engineering.

The V.P.I. scientists developed mathematical equations showing direct relationship between these properties while checking general rules, such as that velocity of sound in a liquid increases as the length of the molecule increases, that introduction of a heavier atom into the molecule reduces the velocity of sound, and that ethers and esters transmit sound in the same way.

They hope to develop other definite relationships that will simplify chemical measurement. Qualities hard to measure can then be calculated from the sound measurements, which can be made easily, quickly and accurately. The scientists report their findings in the *Bulletin of the Virginia Polytechnic Institute* (June).

Science News Letter, September 3, 1955

BIOCHEMISTRY

Seek Clues on Artery Hardening from Roaches

► COCKROACHES, however distasteful, may some day deserve thanks for aiding scientists find ways to conquer artery hardening and subsequent heart disease.

At the Veterans Administration center, Wood, Wis., cockroaches are being used in studies of cholesterol. This is the fat-like material that deposits in plaques in arterial linings, thickening the walls and narrowing the opening, thus reducing blood flow.

Cockroaches must have cholesterol in their diet for normal growth. They cannot manufacture it in their bodies from simple chemicals as humans can.

In the tests at the Wood Center, the insects are given compounds similar to cholesterol. Some compounds substitute in part for cholesterol to furnish clues to the steps that occur in the natural synthesis of the material.

Other compounds, chemically similar to cholesterol, may act as antagonists to cholesterol and prevent growth even when cholesterol is fed at the same time.

In human beings, such a compound competing with cholesterol might keep cholesterol from being deposited in the arteries, thus preventing arterial hardening.

The study is headed by Dr. Jerre Noland, a VA biochemist.

Science News Letter, September 3, 1955

METEOROLOGY

Searching for Hurricanes

► **HURRICANE HUNTING PLANES** should do more searching of upper air levels farther than 200 miles from the storm and less flying in the relatively calm "eye" of the storm.

Dr. Herbert Riehl, University of Chicago meteorologist, charges that information gained by aircraft staying in or near a hurricane's center for long periods to report its hourly position is of "severely limited" value to the forecaster who is "expected to advise about tomorrow's storm threats."

Regular observations are "scarce or missing" over the ocean areas where hurricanes are generated and spend most of their lives, he said. Therefore, Dr. Riehl urges hurricane hunters to take paths at about 15,000 feet that will not only check position of the storm's "eye," but take weather soundings over adjacent areas from which there would otherwise be little or no data.

Although he says it would be best to have several aircraft to conduct both center and far-away surveys, combined missions

are necessary because of economy and lack of aircraft. Dr. Riehl points out that flights "can often be arranged so as to do reasonable justice to both objectives."

He outlines flight routes for two 1954 hurricanes, covering about 2,300 miles, or about six and a half hours in a DC-7 airplane. High airspeed, he says, is necessary if the flights are to be useful for 24-hour predictions.

After flying by an indirect route at 18,000 feet until near the hurricane, Dr. Riehl says that aircraft can then go up or down "to any desired altitude without detracting from the value of the flight for forecasting purposes."

When asked for comments on Dr. Riehl's suggestions, which appear in *Bulletin of the American Meteorological Society* (June), a Weather Bureau official said the bureau was giving "serious consideration" to all proposals for improving prediction of hurricane paths. Dr. Riehl is a well-known expert on tropical meteorology.

Science News Letter, September 3, 1955

BIOCHEMISTRY

Keeping Drunks Sober

► **AN ANTI-TENSION** drug that also helps keep alcoholics sober after withdrawal is soon to go on the market.

It will be available only on a physician's prescription, however.

The drug is called Equanil by its manufacturers, Wyeth Laboratories, Philadelphia. It is a derivative of propanediol, a chemical related to some antifreezes.

It relieves tension and anxiety by direct action on the central nervous system, and takes effect within 45 minutes after being given. No side effects, except slight drowsiness that wears off after three or four days' use of the drug, have been noted.

It is reported to be non-habit-forming. Patients who have taken it do not develop a tolerance for it. Long-time users have not needed bigger doses to gain the effect. On the contrary, they have been able to cut down the dosage.

Most patients in the test series have stopped taking the drug without difficulty and, usually, on their own volition.

Although not effective in severe mental ailments, the drug has been reported to bring "virtual complete recovery from mild neuroses."

Of 27 patients who reported severe tension headaches at the base of the skull, combined with complaints of tight feelings, taut muscles and restless nights, 23 recovered or improved to such an extent that the problem was of no more concern.

Patients with menstrual stress stated that while taking the drug the stress diminished

markedly until they were symptom free and discharged. Psychosomatic pain associated with stomach distress, a frequent and often painful manifestation of tension, was relieved in the majority of 23 patients who were treated with Equanil.

Physicians have reported that they have been able to produce restful sleep without dreams or nightmares in every case treated, with the exception of those in a psychotic state. When Equanil has been used as a substitute for drugs that cause patients to dream, the dreams have disappeared.

Science News Letter, September 3, 1955

PUBLIC SAFETY

Install Traffic Signal For Blind Pedestrians

► **A TRAFFIC SIGNAL** for blind pedestrians has been installed in Louisville, Ky.

The signal, on the roadway separating the Kentucky School for the Blind and the Workshop for the Blind, is the regulation kind except for an added buzzer attachment. Pedestrians can halt traffic by pushing control buttons on poles at the intersection.

As the traffic light changes to red, the buzzer sounds for five seconds, a sign to the blind that they may proceed. Traffic is halted for another ten seconds after the buzzer stops. Estimated cost of the installation is \$350.

Science News Letter, September 3, 1955

AGRICULTURE

Fall Spinach Hybrid Resistant to Diseases

► **TOUGH NEWS** for children is seen in the U. S. Department of Agriculture's development of a new hybrid spinach that is just right for fall planting and that resists blue-mold and blight disease.

The new spinach, called Early Hybrid 7, is for fall crops, yielding 13.5 to 19.6 tons per acre. Seeds will be available in limited quantity for commercial planting this year.

A cross between a blue-mold resistant and a blight-resistant spinach variety. Early Hybrid 7 resists both these diseases. The only hope for young spinach-haters seems to be that, under epidemic condition, a few plants may become diseased.

Science News Letter, September 3, 1955

Questions

MARINE BIOLOGY—How do fiddler crabs show neuritic symptoms? p. 153.

□ □ □

GENERAL SCIENCE—What "secrets" were found in Geneva to have been discovered by scientists from many countries? p. 149.

□ □ □

HORTICULTURE—Of what value are rotating light bulbs for growing hothouse plants? p. 151.

□ □ □

PHYSICS—How do heated liquids reveal their temperatures? p. 152.

□ □ □

TECHNOLOGY—What advantages do radars in aircraft have over ground-based instruments? p. 152.

□ □ □

Photographs: Cover, Goodyear Aircraft Corporation; p. 147, New York University; p. 149, University of Michigan; p. 150, Bell Telephone Laboratories; p. 151, Hans F. Kutschbach; p. 152, The Garrett Corporation; p. 160, Eastman Chemical Products, Inc.

BUILD YOUR OWN NEWTONIAN TELESCOPE

It's easy to assemble a complete professional reflector unit in less than an hour with this new telescope kit. Directions are simple and clear. All parts and optics are precision engineered to the highest standards of accuracy. You'll get observatory results! Send 10¢ for exciting new catalog.

OPTICAL ENGINEERING CO., Dept. SN, 164-19 Northern Blvd., Flushing 58, N.Y.

• New Machines and Gadgets •

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE SERVICE, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 794. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

❁ **TRANSPARENT FINISH** protects wood or linoleum table and sink tops from hot pans, cooking fats, alcohol, detergents and water. After buffing the surface with steel wool, the finish is easily applied with a paint brush.

Science News Letter, September 3, 1955

❁ **SEWING MACHINE** boasts push-button controls that come close to making the machine fully automatic. An estimated 200,000 different types of stitches can be performed by this machine. The machine makes button-holes, darns, blind stitches and monograms automatically, and features an automatic bobbin winder.

Science News Letter, September 3, 1955

❁ **ENAMELED ZIPPERS** are available in various colors to match dress fabrics. The enamel, based on vinyl resins, protects metal of the zipper from water and cleaning chemicals that sometimes rust zippers and stain garments. Zippers have a new rocking slider that prevents embarrassing jamming and sticking.

Science News Letter, September 3, 1955

❁ **"DOGGY" CLOCK** is molded in the shape of Disney's Pluto, as shown in the photograph. The electric clock's face is a



feeding bowl planted on the dog's belly. As the clock runs, turning hour and minute hands shaped like bones, the comic dog rolls his eyes and moves his tongue in anticipation of a meal that never comes.

Science News Letter, September 3, 1955

❁ **CONTACT LENSES** are claimed to be 24% smoother than contact lenses pre-

viously available, increasing the wearer's comfort and vision. The fluidless lenses are made by a plastic-forming method in which the lenses are, in turn, subjected to heat, pressure and cooling.

Science News Letter, September 3, 1955

❁ **MOTOR BIKE**, imported from Holland, has a very low center of gravity and a two-stroke, one-cylinder engine that develops 2.1 horse power. An adjustable suspension seat and telescoping front fork add to riding comfort. Long-wearing drum brakes provide large braking surface for the bike.

Science News Letter, September 3, 1955

❁ **CORDLESS HEARING AID** can be worn entirely in the ear. Weighing less than one-half ounce, the aid contains three tiny transistors. Since the entire one-unit aid is worn in the ear, clothing noise is eliminated and telephoning is simplified.

Science News Letter, September 3, 1955

❁ **OUTDOOR THERMOSTAT**, expected to cost 75% less than existing automatic systems, signals the indoor thermostat when the weather changes. Then the indoor thermostat turns the furnace on or off immediately, instead of waiting until inside temperature drops or becomes uncomfortably hot. The new unit will be marketed in January, 1956.

Science News Letter, September 3, 1955

A FEW MEMBERSHIPS ARE NOW AVAILABLE

in *Things* of science

A WONDERFUL GIFT . . . ANY TIME OF YEAR

ONCE A MONTH for a year we will pack a blue package with scientific fun, with mental stimulation, with hours of absorption, with future hobbies, with knowledge; but specifically we will pack the boxes with THINGS of science—real objects of science to be handled and looked at and owned. And with them, sheets of suggested experiments and complete explanations of them. There are now more than ten thousand members of the group of friends of science who receive one of these exciting boxes each month. This unusual service comes one year postpaid for \$5.00. (Add \$1 for additional postage on outside U.S.A. addresses.) Use this coupon to send in your gift membership NOW.

Send THINGS of science for one year to the names and addresses on the attached sheets.

- ☐ Renew my own subscription for one year.
- ☐ Payment enclosed. ☐ Bill me.
- ☐ Send gift card in my name as imprinted at the left.

Do You Know?

Most vegetables absorb 10% of their total nitrogen requirement in the first quarter of the growing period, 20% in the second, 40% in the third and the remaining 30% from then until harvest.

Pollen is the male fertilizing element of flowering plants, trees and grasses; it consists of fine, powdery, yellowish grains that are microscopic in size.

It is now possible to fill the four chambers of the heart with a chemical that makes them stand out in an X-ray chart and to demonstrate position, size and shape of the chambers and the sequence in which they fill.

One pound of uranium, a piece no larger than a golf ball, if fissioned completely, could produce as much energy as 2,500,000 pounds of coal.

The African pygmy is still in the hunting stage of civilization and knows little of agriculture or pasturage.